REMARKS

In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application. Claims 1, 2, 4-7, 10-12, 14-16, 18, 19, 27-31 and 32-47 are pending. No claims are cancelled. No claims are amended. No claims are added. Applicant appreciates the Office's indication of allowable subject matter in claims 33-39 and 41-47. This amendment is believed to be fully responsive to all issues raised in the Office Action mailed July 21, 2004.

Claim Rejections

Rejections Under 35 U.S.C. §103

Claims 1-2, 4-6, 10-12, 14-16, 18-19, 27-32 and 40 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,412,042 to Paterson, et al., (hereinafter, "Paterson") in view of U.S. Patent No. 5,787,242 to DeKoning (hereinafter, "DeKoning") and further in view of U.S. Patent Publication No. 2002/0083299 to Van Huben (hereinafter, "Van Huben"). Applicant respectfully traverses these rejections.

Claim 1 relates to a rotating data storage disk system comprising:

- a plurality of concentric tracks defined on a disk;
- said disk including at least two data storage areas, wherein each area is sized to store a copy of a set of data and the data storage areas are substantially equidistantly spaced from each other and wherein all of the at least two data storage areas are located within plus or minus one track of the same track;
- a drive mechanism coupled to the disk; and
- a remote controller in communication with the drive mechanism for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk.

Of particular interest, claim 1 specifically recites that a remote controller in communication with the drive mechanism maintains data coherency between the at least two data storage areas and keeps track of deferred writes to the at least two data storage areas of the disk. The Action concedes that Paterson fails to disclose or suggest a controller in communication with the drive mechanism for keeping track of deferred writes to the at least two data storage areas. The Action then looks to Dekoning to teach such limitations. The Action asserts that "DeKoning teaches the concept of a controller in communication with a drive mechanism for keeping track of deferred writes (pinned data) to data storage areas of the disk, which

maintains data coherency between the at least two data storage areas." Applicant respectfully disagrees.

Dekoning describes methods and apparatus for moving pinned data corresponding to a temporarily dead RAID device between the cache memory of a RAID subsystem and a log area. In response to detection of a dead RAID device within a RAID subsystem, the methods move any pinned data from the cache memory of the RAID controller to a log area preferably allocated on the disk space of one or more operational RAID devices within the subsystem. In response to revival of the dead RAID device the methods restore the logged, pinned data from the log area of the operational RAID device(s) to the cache memory as dirty data ready for posting to the revived RAID device. (Dekoning Abstract.) As such Dekoning's system is interdisk- i.e. cache data associated with a dead disk is moved to a live disk to free up space on the cache for other system functions. Dekoning is totally silent as to processes relating to "a remote controller... for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk" as recited in claim 1. Claim 1 further defines the at least two data storage areas such that "each area is sized to store a copy of a set of data and the data storage areas are substantially equidistantly spaced from each other and wherein all of the at least two data storage areas are located within plus or minus one track of the same track".

The Action cites column 5, lines 1-56 of DeKoning to support the rejection. Applicant has analyzed DeKoning generally and specifically at column 5, lines 1-56. In brief, the text of column 5, lines 1-56 describes

writing data that is "pinned" in the RAID cache (*e.g.*, due to a dead RAID device) to a log file that resides on another disk drive in the RAID device to clear the RAID cache for use by the remaining RAID drives. (See, Fig. 2). This text further describes writing the data back from the log file to the RAID cache when the dead RAID device has been repaired or replaced. (See, Fig. 3). Dekoning is totally silent as to what is done with the restored cache data.

DeKoning neither discloses nor suggests "a remote controller in communication with the drive mechanism for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk", as recited in claim 1. DeKoning merely writes pinned data from a cache to a log file, and writes the data back to the cache at a later point in time. Contrary to the assertion in the Action, DeKoning neither discloses nor suggests "a remote controller... for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk."

The Office finally states that "DeKoning does not explicitly disclose a remote controller performing the above features." The Office then turns to Van Huben stating that "Van Huben discloses the concept of a remote controller maintaining coherency between the data storage areas." Applicant respectfully disagrees. Van Huben, like Dekoning, does not teach or describe a remote controller in communication with the drive mechanism for maintaining data coherency between the at least two data storage areas and

keeping track of deferred writes to the at least two data storage areas of the disk", as recited in claim 1. Van Huben describes:

> A high speed remote storage controller system for a computer system has cluster nodes of symmetric multiprocessors. A plurality of clusters of symmetric multiprocessors each of has a plurality of processors, a shared cache memory, a plurality of I/O adapters and a main memory accessible from the cluster. Each cluster has an interface for passing data between cluster nodes of the symmetric multiprocessor system. Each cluster has a local interface and interface controller. The system provides one or more remote storage controllers each having a local interface controller and a local-to-remote data bus. A remote resource manager manages the interface between clusters of symmetric multiprocessors. The remote store controller is responsible for processing data accesses across a plurality of clusters and processes data storage operations involving shared memory. A macro is provided for processing a plurality of simultaneous data storage operations either synchronously through interaction with a sequential multistage centralized pipeline to serialize requests and provide address interlocking services or asynchronously whereby main memory accesses bypass a centralized system pipeline. These accesses can occur in parallel with other remote storage operations. (Van Huben, Abstract)

Van Huben is silent in relation to the same claim elements as Dekoning namely "a remote controller in communication with the drive mechanism for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk".

Paterson, Dekoning and Van Huben taken individually or as a whole do not teach or suggest "a remote controller in communication with the drive mechanism for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the at least two data storage areas of the disk", as recited in claim 1. Accordingly, Applicant submits that the rejection of claim 1 is improper and should be withdrawn.

Claims 2, 4-7, 10 and 32-39 depend from claim 1 and are allowable at least by virtue of this dependence.

Independent **claim 11** recites the limitation of a controller for maintaining data coherency between the at least two data storage areas and keeping track of deferred writes to the data storage areas. Independent claim 11 is allowable for at least the same reasons applied to independent claim 1.

Claims 12, 14-16, 18-19 and 40-47 depend from claim 11 and are allowable at least by virtue of this dependence.

Independent **claim 27** recites the limitation of means for maintaining data coherency between a first data storage area affected by a received write request and a second data storage area affected by a replicated write request. Independent claim 27 is allowable for at least the same reasons applied to independent claim 1.

Claims 28-31 depend from claim 27 and are allowable at least by virtue of this dependence.

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CONCLUSION

All pending claims are believed to be in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the present application. Should any issue remain that prevents immediate issuance of the application, the Examiner is encouraged to contact the undersigned attorney to discuss the unresolved issue.

Respectfully Submitted,
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